



IPv6 Collaboration Architecture

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Agenda

➤ **IPv6 Collaboration Requirements and Certification**

➤ **UC IPv6 Collaboration Architecture**

➤ **Network Deployment Models**

➤ **Discuss: Addressing, protocols and use cases**

➤ **Call for Action**



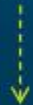
IPv6 Lingo based on RFCs

- IPv4-only is traditional IPv4, network services
- Dual-stack (DS) will be the most common deployment scenario, where signaling (SIP and SCCP), media and management systems network “servers” will be configured with both v4 and v6 addresses, while devices e.g. endpoints and GW may be v4-only, or dual-stack or v6-only. Dual Stack Media offering and selection will be based on Alternate Network Address Type (ANAT) in SIP SDP is a mandatory requirement for the UCR certification.
- IPv6-only device has only v6 addresses configured on all its external interfaces and communicates with devices using only IPv6 addresses. While configuring to IPv6-Only a device may seek IPv4 address temporary while it destine for IPv6-Only address. In IPv4 stack will coexist with IPv6 active stack but application will not bind it. Application of that device must release IPv4 address if it is used due to configuration option selection.
- IPv6-aware that is applicable to management system communicates with devices using v4 protocols (SNMP, Syslogs, AXL, etc.), but is able to recognize, store, and display v6 addresses in the v4 payload. For example, Network Management may process IP-MIB info using SNMP over v4, but should be capable of recognizing v6 addresses configured on the interfaces of the device. All of its northbound functions (HTTP/S, Web Services, Traps, Syslogs, etc.) are also exposed via v4-enabled protocols only.

Source of IPv6 Collaboration Requirements And Certifications

DoD vs. US Gov't Civilian IPv6 Programs

Three elements
of the IPv6
Certification
Programs



Profile
Definition

DoD IPv6 Standard
Profiles For IPv6
Capable Products

A Profile for IPv6 in
the U.S. Government

Program
Definition

Unified Capabilities
Requirements (UCR)

USGv6

Certification
Labs

Joint Interoperability Test
Command (JITC)

UNH-IOL
ICSA



Department
of Defense

US Gov't
Civilian Agencies

- IPv6 Ready Logo is a common denominator based on TAHI test scripts

IPv6 Certification Program Comparison

DoD UCR

- Focused on Voice, Video and Security Products
- Focused on functional category testing
 - e.g. ASLAN, EBC, LSC
- NOT IPv6 specific testing
- Complex testing scheduled well in advance
- Strict Pass / Fail to get onto APL

NIST USGv6

- All inclusive – any product with an IP stack must be certified
- Box level, protocol testing
- Less complex testing, usually easily scheduled
- MUCH more nuanced program that relies on SDOC vs. APL

+ RIPE IPv6 and others

Based on:

- USGv6
- IPv6 Ready Logo
- UCR for Collaboration



The IPv6 Forum
The New Internet

IPv6 Ready Logo

Dual Stack Media SIP SDP Alternative RFCs

For a dual stack endpoints based on SIP signaling the following options are on the table to deploy or develop in SIP SDP media offering (multiple m-lines) with IPv4 or IPv6 and dual stack v4/v6 address attributes:

1) Alternate Connectivity (ALTC): <http://etherpad.tools.ietf.org/pdf/draft-boucadair-mmusic-altc-06.pdf>

2) Alternative Network Address Types (ANAT) RFC 4091 and 4092

3) ICE: guidance for IPv6/IPv4 implementations,



DoD UCR specification has endorsed ANAT that will be supported by all major vendors.

USGv6 Requirements

IPv6 Base	Routing
RFC 2460 IPv6 Spec, <u>PMTU</u> , <u>ICMPv6</u> , Neighbor Discovery, DAD	<u>OSPFv6</u> , <u>BGP-4</u>
IPv6 Addressing	IPv6 Quality of Service
IPv6 Addressing Architecture, IPv6 Scoped Addressing Architecture	<u>Differentiated Services (DiffServ)</u> , <u>Per Hop Behavior (PHB)</u>
IPv6 Multicast	Network Management
<u>MLDv2</u> , <u>Protocol Independent Multicast (PIM)</u>	<u>SNMPv3</u> , <u>Various MIBs</u>
Transition Mechanism	IPv6 Security
Dual Stack, Tunneling, GRE	<u>IPsecv3</u> , <u>ESP</u> , <u>IKEv2</u> , <u>Crypto</u> for <u>IPsecv3</u> and <u>IKEv2</u>

- At OS Level
- No Collaboration applications

IPsec: Mandatory or Optional

In the original IPv6 Node Requirements (RFC4294) standard, IPsec was listed as a 'MUST' implement to be standards compliant. The updated RFC (RFC6434) changed IPsec to a 'SHOULD' implement. Reasons for the change are stated in this new RFC.

The RIPE IPv6 Working Group has extensively discussed whether to make IPsec support mandatory or optional. The most vocal constituents showed support for moving IPsec to the optional sections, which is what is reflected in this document.

IPv6 Logo Certification



IP Phone
Certified

The IPv6 Forum IPv6 Ready Logo program has clearly demonstrated the widespread support of IPv6 in products. The impressive list of vendors indicates the number of potential IPv6 users ready to use IPv6 and represents a real incentive for Enterprise and ISPs to enable IPv6 access for their customers to deploy IPv6 logo certified products.

Baseline for all certifications
SIP is under Experimental status

USGv6 Certifications Information

<https://www.iol.unh.edu/services/testing/ipv6/usgv6tested.php?company=658&type=Host#eqplist>

Company:

Product Type:

Search

Test Types

☐ Addr Arch

☐ BGP

☐ Basic

☐ DHCPv6 Client

☐ DHCPv6 Server

☐ ESP

☐ FW

☐ IDS

☐ IKEv2

☐ IPS

☐ IPsecv3

☐ OSPFv3

☐ SLAAC

- No USGv6 Certification for:
- Android
 - iPad devices
 - iMac

Collaboration Network

Architecture Attributes

IPv6 Transition Methods

1. NAT64 and DNS64

2. From Edge-v6 to Core-v4

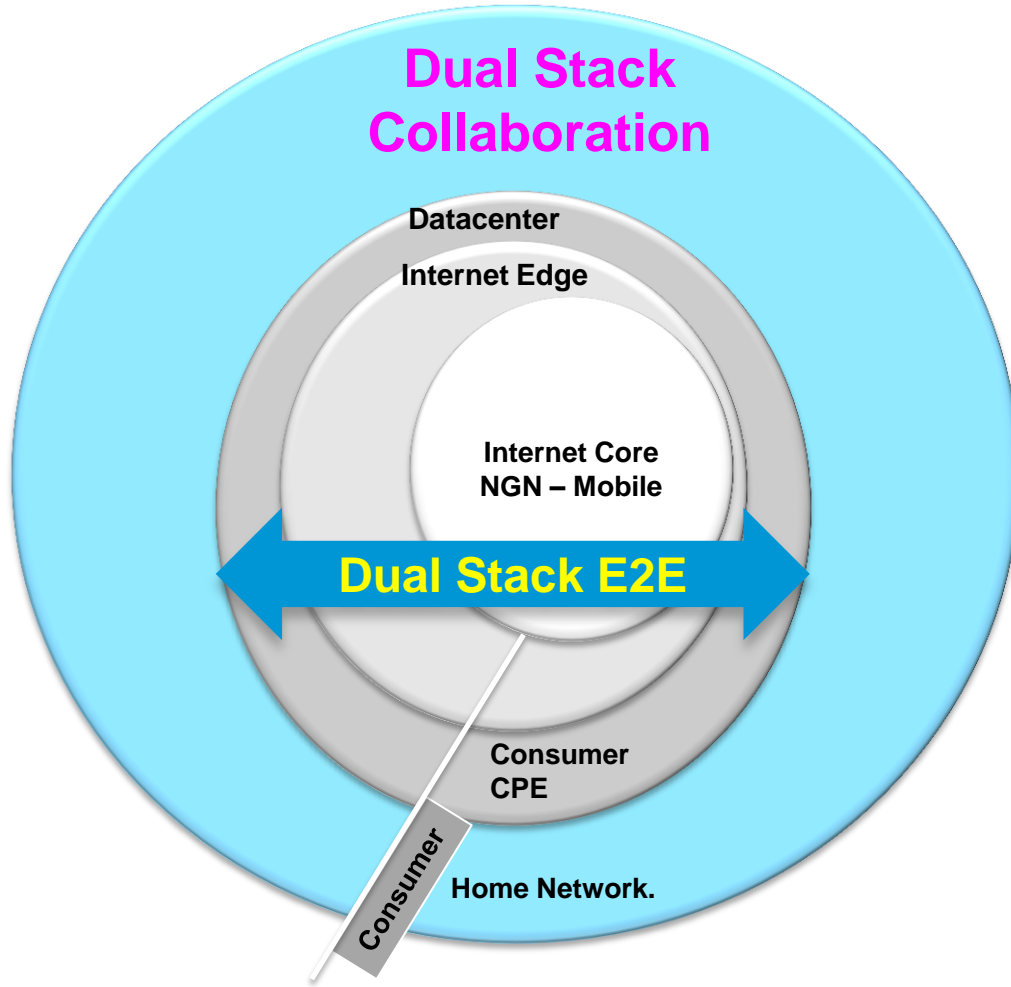
- Outside-In
- Tunnel 6 to 4

3. Native Dual Stack (DS) end to end

- Collaboration Network
- End Users feature parity with IPv4, end user transparency/painless
- Start DS and phase out IPv4 as applications are developed in IPv6
- Product Development in multiple phases to catch with IPv4



IPv6 Collaboration Adoption (Inside-Out)

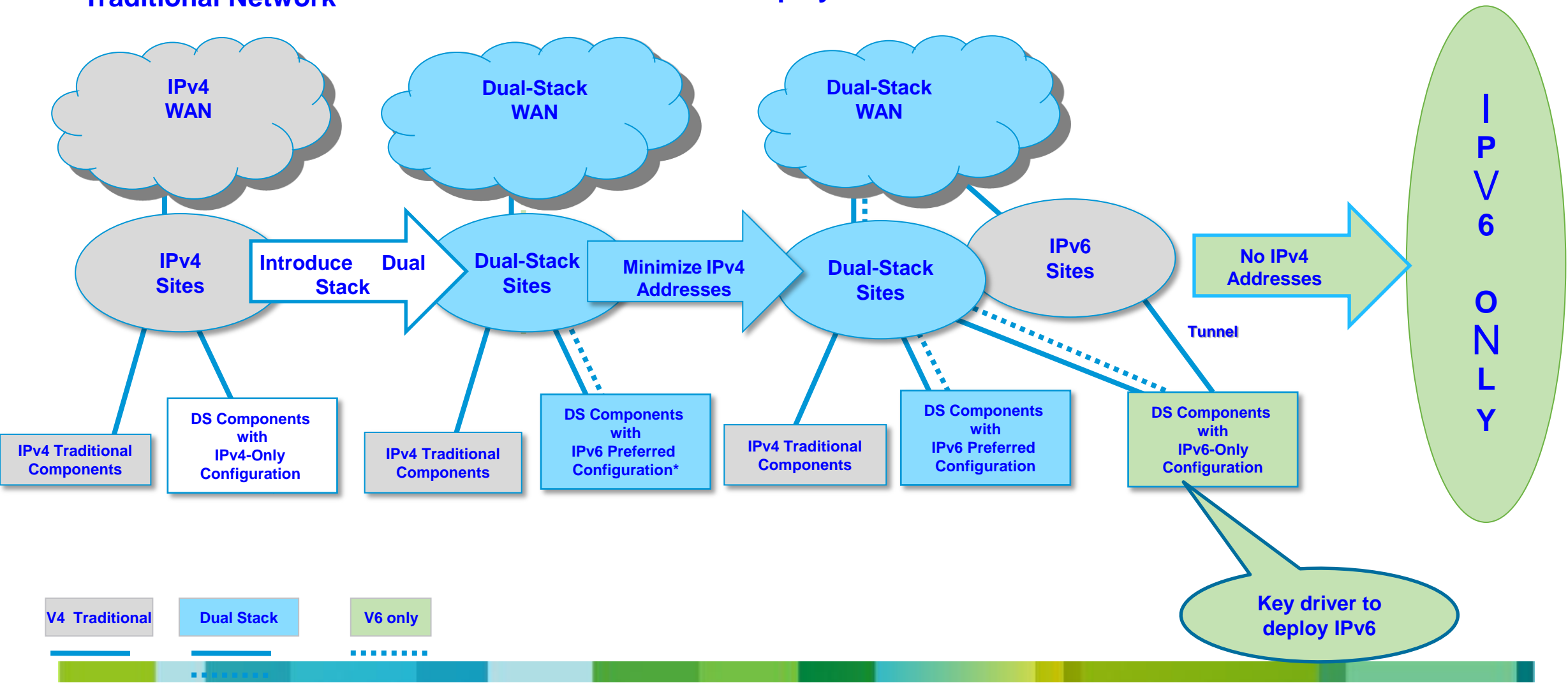


- Collaboration IPv6 market is ready and asking for a native IPv6 as a mandatory requirements to meet end to end solutions in all components
- IPv6 is mandated in a procurement process by many governments world wide in all RFPs for 2013-14 deployment that meets the DoD USR, USGv6 and IPv6 Logo requirements
- Major enterprise customers will participate in limited production network deployment

UCIPv6 Network Deployment Models

Traditional Network

Dual Stack Deployment



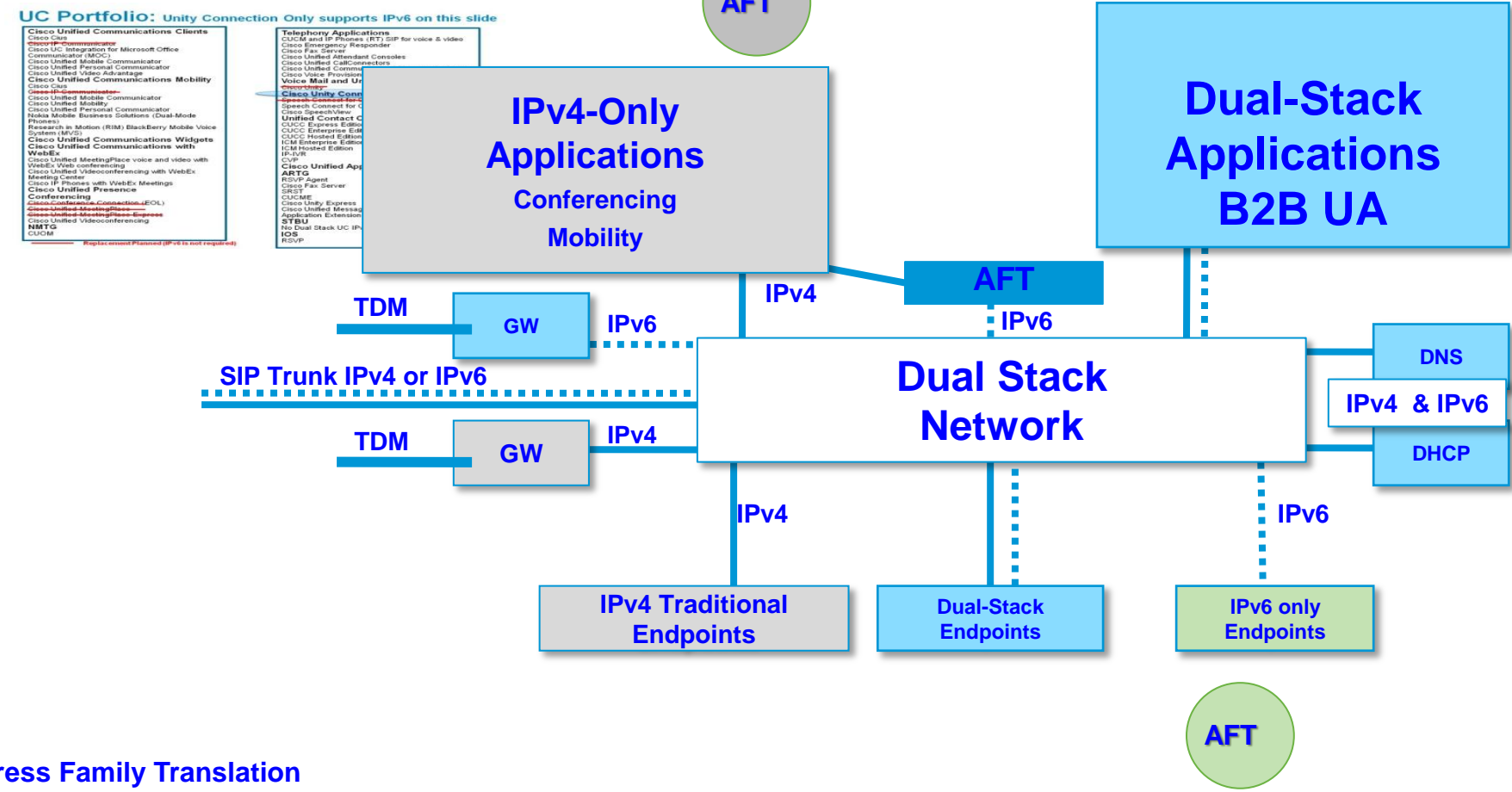
Address Assignment Options

Component	SLAAC	DHCPv6 Stateful	Manual
Soft endpoint	Yes	Yes	Yes
Hard endpoint	No	Yes	Yes
Server (Application)	No	No	Yes
DoD Secure Devices	No	No	Yes

Example of IP Phones IPv6 Address Assignment Implementation:

- One Link Local Address and
- Multiple Unique Local Addresses
- Multiple Global Addresses
- and an IPv4 address

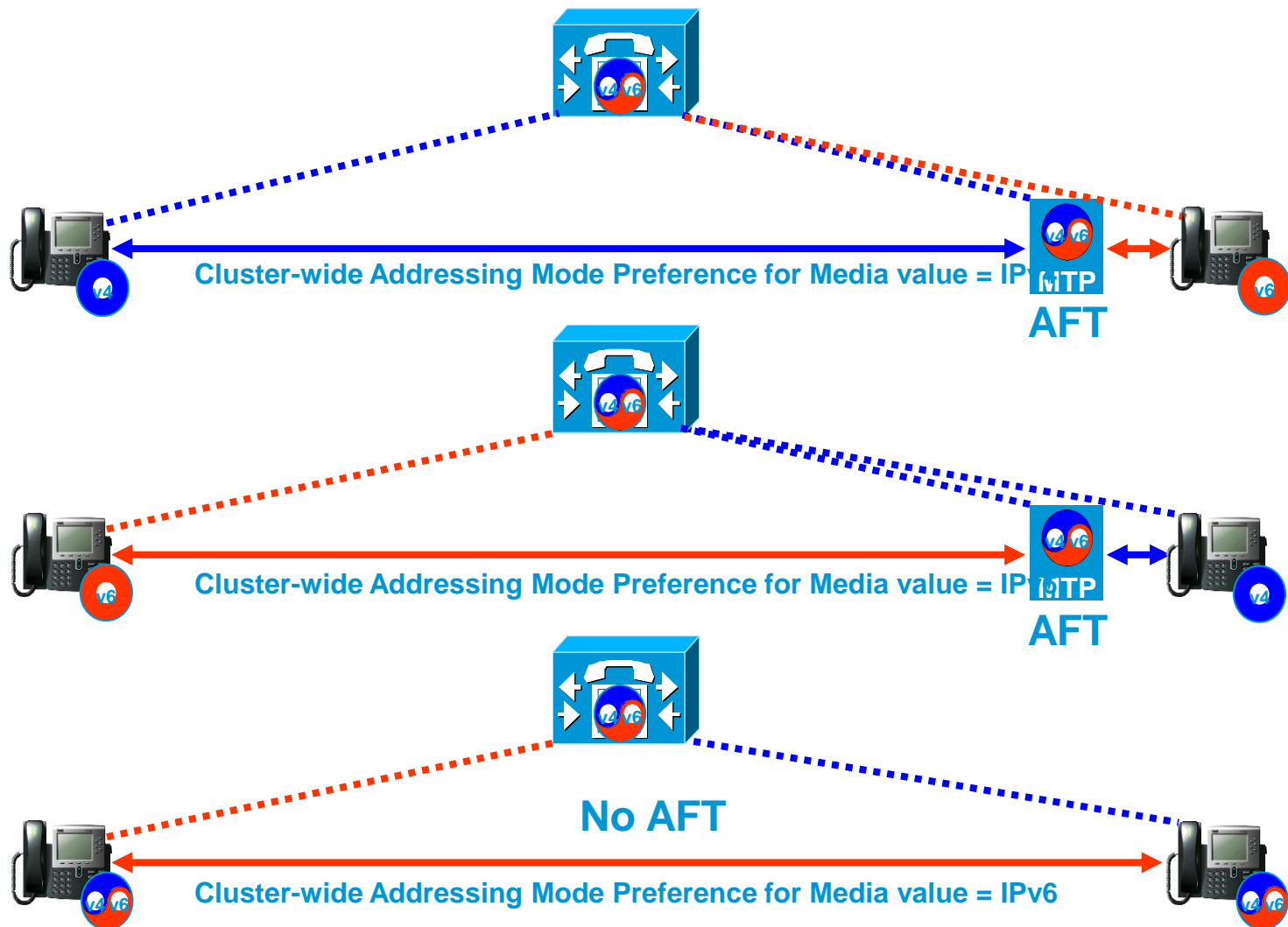
UC Architecture Dual Stack => Starting Point



AFT: Address Family Translation

Functional Parity Between IPv4 and IPv6
One Software Load

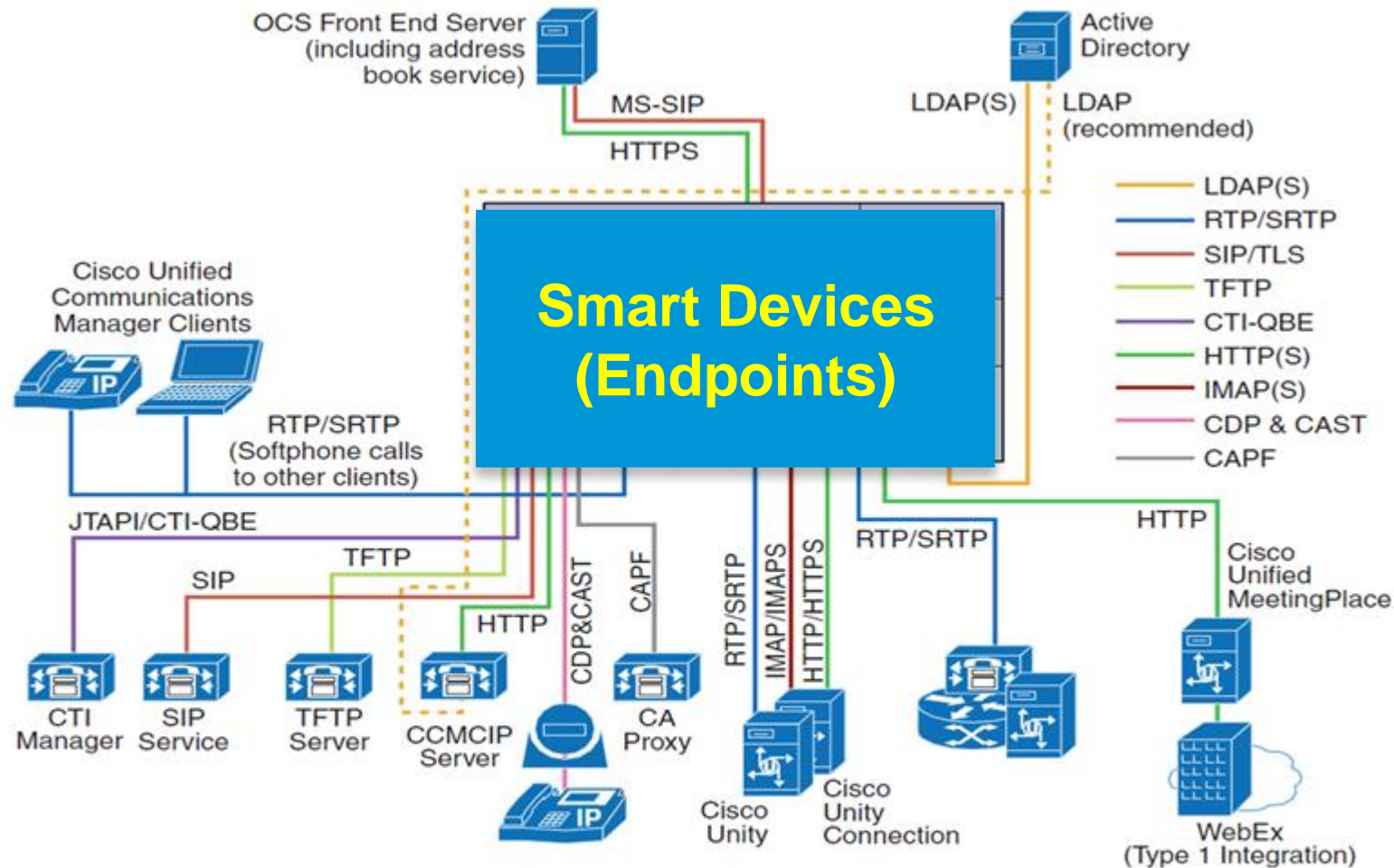
Media Address Family Translation (AFT)



No AFT for a dual stack endpoint connected to IPv4-Only or IPv6-Only or DS endpoint

Dual Stack Advantage

Collaboration Protocols



- Data Services
- Voice
- Video
- IM/Presence
- Location

QoS: Same as IPv4

- DiffServ values are same
- IPv6 Flow Label set to zero at endpoints and GW

CAC

- Add 20 Bytes IPv6 Overhead

Deployment Models

- Same as IPv4

Security

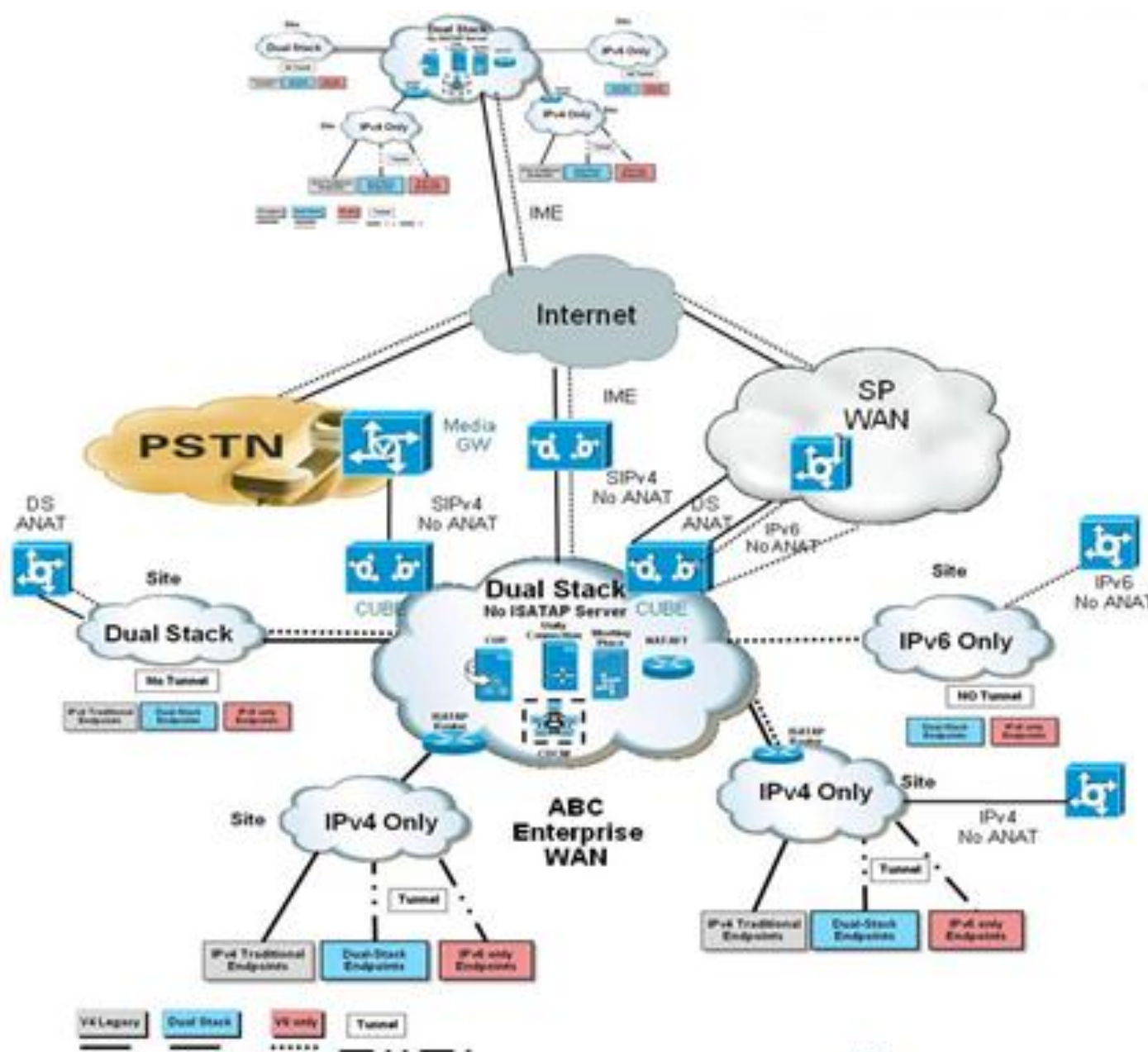
- TLS and sRTP same as IPv4, note no IPsec

IPv6 Deployment Flexibility

- By Site (floor, building), by SIP trunking (SP)

Dual Stack Deployment Models

- Dual Stack Data Centre
- Dual Stack endpoints with Configuration options: IPv4, IPv6, or DS
- IPv6 External Interfaces
- Sites: IPv4, IPv6, or DS
- B2B UA provides AFT interworking
- SIP line and trunk for voice and video
- XMPP for IM/Presence
- Network Management dual stack support



IPv6 Deployment Flexibility
By Site (floor, building), by SIP trunking (SP) and PSTN GW

Dual Stack Does not solved IPv4 Exhaustion Issue

Scale of Deployment (Endpoints)	Servers & Gateways (Dual Stack or IPv4)	IPv4 Addresses before deploying IPv6-only Endpoints	IPv4 Addresses after deploying IPv6- Only Endpoints	Percent Reduction in IPv4 Addresses
500	6	506	6	98.8%
5,000	13	5,013	13	99.7%
10,000	25	10,025	25	99.8%

Reduction in IPv4 Address Utilization

IPv6 Only Endpoints are key to large deployment

Call To Action

- New Component implementations must support IPv6.
- Updates to current component implementations should support IPv6
- New and updated IP Networking implementations should support IPv4 and IPv6 coexistence (dual-stack), but must not require IPv4 for proper and complete function.

It is the new Internet Protocol, It requires special attention and focus over this critical procurement period .